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ST. AUGUSTINE CHURCH (STORM WATER DETENTION)

7/18/03

$$\begin{aligned} \text{TOTAL DRAINAGE AREA} &= 182' \times 220' &= 40,040 \text{ SF.} \\ & &= .92 \text{ ACRE} \end{aligned}$$

$$\begin{aligned} \text{BUILDING AREA} &= (115' \times 50') + (110' \times 62') + \\ & (42' \times 10') + (14' \times 16') + \\ & (42' \times 10') &= 13,634 \text{ SF.} \\ & &= .31 \text{ ACRE} \end{aligned}$$

$$\begin{aligned} \text{PAVEMENT AREA} &= \begin{array}{l} \text{DRIVE} \qquad \qquad \text{DRIVE} \\ (38' \times 150') + (22' \times 155') + \\ \text{DRIVE} \qquad \qquad \text{DRIVE} \\ (21' \times 24') + (162' \times 14.5') + \\ \text{DRIVE} \qquad \qquad \text{DRIVE} \qquad \text{walk} \\ (16' \times 5') + (60' \times 17') + (150' \times 5') + \\ \text{walk} \qquad \qquad \text{walk} \qquad \qquad \text{walk} \\ (5' \times 17') + (45' \times 11') + (102' \times 8') + \\ \text{walk} \qquad \qquad \text{steps} \qquad \qquad \text{walk \& steps} \\ (27' \times 6') + (14' \times 49') + (40' \times 5') + \\ \text{walk} \qquad \qquad \text{walk} \\ (24' \times 21') + (39' \times 3') \end{array} = 16878 \text{ SF.} \\ & &= .39 \text{ ACRE} \end{aligned}$$

$$\text{GRASS AREA} = .92 \text{ A.} - .31 \text{ A.} - .39 \text{ A.} = .22 \text{ ACRE}$$

DESIGN FOR 2 YEAR STORM (24 HR. STORM)

$$i = 2.60 \text{ in/hr (20 MIN.) (TABLE OH-1, TR-55 OH10)}$$

$$C_{\text{ROOF}} = .90$$

$$C_{\text{PAVEMENT}} = .90$$

$$C_{\text{GRASS}} = .15 \quad \begin{array}{l} \text{BUILDING} \qquad \qquad \text{PAVEMENT} \qquad \qquad \text{GRASS} \\ (.31 \text{ A.} \times .90) + (.39 \text{ A.} \times .90) + (.22 \text{ A.} \times .15) \end{array}$$

$$C_{\text{AVG}} = \frac{\quad}{.92 \text{ A.}}$$

$$C_{\text{AVG.}} = .72$$

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PRE-DEVELOPMENT "C" = .30

POST-DEVELOPMENT "C" = .72

$$Q_{2A} = .30 \times 2.60 \times .92 \text{ ACRE} = .72 \text{ C.F.S.}$$

$$Q_{2B} = .72 \times 2.60 \times .92 \text{ ACRE} = 1.72 \text{ C.F.S.}$$

$$\frac{(Q_{2B} - Q_{2A})}{Q_{2A}} = \frac{1.72 - .72}{.72} = 139\% \text{ INCREASE}$$

CRITICAL STORM (FROM TABLE PAGE 20 OF NAPOLEON
25 YEAR STORM ENGINEERING DEPT. RULES & REGULATION)
USE 10 YEAR STORM FREQUENCY (MIN.) PER CITY
24 HOUR STORM

POST DEVELOPMENT RUNOFF

MAX. OVERLAND FLOW DISTANCE - 290'

AVG. SLOPE < 1% , PART GRASS, PART PAVEMENT

USE PARKING LOT W/ TOP OF CATCH BASIN AT 1'-1"
BELOW OUTSIDE EDGE OF PARKING LOT

MIN. VOLUME REQUIRED = 2149 c.f. (10 YEAR STORM)

VOLUME REQ'D. FOR 25 YEAR STORM = 3024 c.f.

$$\text{VOLUME} = \frac{\text{Area} \times \text{Depth}}{3} = \frac{72' \times 55' \times 1.0'}{3} + \frac{60' \times 55' \times 1.0'}{3}$$

$$\text{VOLUME} = 2420 \text{ c.f.} > 2149 \text{ c.f. req'd.}$$

ok

see
Hatched
etc's.

Detention Design Meter Line Check

Data:

- 1. Length of Meter Line (L) 35 ft.
- 2. Slope of Meter Line (%) 0.4 %
- 3. Size of Meter Line (in.) 4 in.
- 4. Manning's N: PVC = 0.010 0.015 → *Corrugated Plastic Pipe*
 CMP = 0.024
 Others = 0.013
- 5. Entrance Coeff. (Ke) 0.5
- 6. Assumed Max. Head (H) 8 ft.
- 7. Hydr. Radius (R) 0.084 ft.
- 8. Radius 0.1670 ft.
- 9. Area 0.088 sq. ft.
- 10. Perimeter 1.05 ft.

Assumed Head (H)	$H \times 2g$	$1 + K_e + (29n^2L/R^{4/3})$	V^2	V	Area of Pipe (A)	Flow (Q.)
0.5	32.2	7.76	4.15	2.04	0.088	0.18
1.0	64.4	7.76	8.30	2.88	0.088	0.25
1.5	96.6	7.76	12.45	3.53	0.088	0.31
2.0	128.8	7.76	16.60	4.07	0.088	0.36
2.5	161	7.76	20.75	4.56	0.088	0.40
3.0	193.2	7.76	24.90	4.99	0.088	0.44
3.5	225.4	7.76	29.06	5.39	0.088	0.47
4.0	257.6	7.76	33.21	5.76	0.088	0.50
4.5	289.8	7.76	37.36	6.11	0.088	0.54
5.0	322	7.76	41.51	6.44	0.088	0.56
5.5	354.2	7.76	45.66	6.76	0.088	0.59
6.0	386.4	7.76	49.81	7.06	0.088	0.62
6.5	418.6	7.76	53.96	7.35	0.088	0.64
7.0	450.8	7.76	58.11	7.62	0.088	0.67
7.5	483	7.76	62.26	7.89	0.088	0.69
8.0	515.2	7.76	66.41	8.15	0.088	0.71
8.5	547.4	7.76	70.56	8.40	0.088	0.00
9.0	579.6	7.76	74.71	8.64	0.088	0.00
					Flow (Qmax)	0.71

